portant contribution. In the first place he not only confirms, by clear and independent evidence, the decision accepted by the officers of the Great Trigonometrical Survey of India, that the names such as Gaurisankar, Deodhunga, &c., applied by B. H. Hodgson and H. Schlagintweit to the highest peak of the Himalayas, do not belong to it at all, although the first of them has been extensively used on German maps, but he also shows that there is a Tibetan name *Jomo-kang-kar*, meaning "The Lady White Glacier," which apparently does apply to the culminating peak of the Everest group. Secondly he points out that, according to the Tibetans, there is another mountain, due north of Mount Everest, that exceeds even that peak in height, and must therefore be the highest mountain in the world, unless some other Tibetan peak, as yet unmeasured, exceeds it. Apparently no European has yet set eyes upon this mysterious summit of the upper Lap-chi-kang; its discovery and measurement afford a grand opportunity for a future geographer and explorer. Before quitting this subject, a hope may be expressed that no one will be found so utterly lost to all sense of humour as to adopt the barbarous hybrid term of *Kong-kar-Everest* for the monarch of the Himalayas; it is astounding to find Major Waddell writing calmly of the matter, and apparently without any appreciation of the fact that the name is absurd. This is the more surprising, for Major Waddell is justly severe on the ignorance which insists on adding superfluous aspirates and other letters to native names, and he reproves the people who write "Thibetian" for Tibetan and "Gnathong" for Na-tang.

Major Waddell has paid great attention to Sikhimese birds, but he appears to have a rather imperfect acquaintance with the mammals. He writes of the "marsh-deer or sambhar" (p. 260) apparently under the idea that both are names applied to the same animal, he calls the *Goomcher* or *Gumchen* of Tibetans a tailless rat or marmot, whereas it is a *Lagomys* or pika, and he even writes of the Serow, a goat-antelope, as the Serow deer. He must have been misled by some of his followers into supposing (p. 113) that tracks he saw on Tendong, a few miles north of Darjeeling, in oak and magnolia forests, about 8500 feet above the sea, were those of Bharal, *Ovis nahura*, an animal that does not inhabit this part of Sikhim, and that never enters forests at all. It may be added that, especially with regard to Latin names, the book appears not to have been read quite as carefully as is necessary, for *Ovis nahura* becomes *Ovis nehur* on p. 113, and *Ovis natura* on pp. 216 and 225; whilst *Nectrogale* for *Nectogale* (p. 219), *caerulus* for *caeruleus* (pp. 77, 240), *Grandula* for *Grandala* (p. 216), and *Calliophis* for *Callophis* (p. 77), are other instances of misprints. To some extent names of places suffer from the same want of revision; thus the Sibu Pass of the map and Seeboo Pass of p. 215, is apparently the Sherboo Pass at p. 161. Another curious case of oversight is the statement, on p. 330, that the peaks of the Everest group are shut out from view at Senchal by a dark ridge, although a figure of the peaks in question, as seen from Senchal, is given on p. 33; the fact being that it is the lower portions of the Everest group, not the peaks, that are shut out.

These, however, are minor drawbacks, and do not prevent the work from being a valuable addition to Himalayan literature. W. T. B.

PROFESSOR SOPHUS LIE.

IT is with much regret that we have to announce the death of this distinguished Norwegian mathematician, which took place on February 18 of the present year.

Born at Christiania on December 12, 1842, he graduated as Doctor in the University of that city in 1868. Four years later he was appointed professor extraordinarius of mathematics; and in 1886 he succeeded Klein as professor at Leipzig, when the latter was nominated to Göttingen. During the last few years a strong desire has been felt by his fellow-countrymen that he should occupy a professorship in his native country, and that a post should be specially created for him in Christiania. It was only quite recently that this desire had been gratified; unhappily too late to be effective. His strength had been undermined by the intense ardour with which he pursued his investigations; and his health, thus broken, has forbidden any long tenure of a chair in which, as had been hoped, he would be able to continue his mathematical researches.

When once the merit of his work began to be recognised, scientific honours were bestowed upon him freely. He had received the honorary or foreign membership of societies and academies in great numbers; in particular, in England alone, he was enrolled among the foreign members of the Royal Society, and among the honorary members of the Cambridge Philosophical Society and the London Mathematical Society.

The list of his scientific productions includes over 100 papers, many of them of considerable length, and six volumes. Probably he will be best known by the treatise "Theorie der Transformationsgruppen," in the preparation of which he was assisted by the loyal devotion of Dr. F. Engel. It is a work of great originality, containing many methods and a wide range of development; it exhibits in masterly manner the suggestive application of new methods to fundamental subjects; and it may be described briefly as a systematic exposition of Lie's investigations on groups of transformations that are continuous and finite. Among the subjects to which application is made, may be mentioned the theory of ordinary differential equations; the theory of partial differential equations, both single and in systems; differential invariants and their types; the solution of Pfaff's problem; tangential transformations, specially in spaces of two and three dimensions, and more generally in *n* dimensions; groups of functions transformable into one another, and a substantial simplification (by the use of their properties) in the integration of systems of partial differential equations; a complete determination of types of the groups of transformation in one, two, and three variables, and a partial determination of those in *n* variables. It concludes with a profound study of the foundations of geometry from the point of view of Riemann and Helmholtz; and after a critical discussion of the significance of the hypotheses which they made, he propounds a solution of his own, based upon more elementary hypotheses.

In a couple of instances, his lectures in amplification and elucidation of portions of his theory were edited and published in volume form by Dr. G. Scheffers, whose help is gratefully acknowledged: one of these relates to differential equations that admit of known infinitesimal transformations; the other to continuous groups.

Two other works were promised by him. One of these, to be written in co-operation with Dr. Engel, was to deal with the theory of infinite continuous groups and the application of the general group-theory to the integration of differential equations: this work has not appeared. The other, to be written in co-operation with Dr. Scheffers, was to be devoted to a systematic exposition of his geometrical investigations; the first volume has appeared under the title, "Geometrie der Berührungstransformationen."

As already indicated, his name at the present time would probably be associated most closely with the theory of continuous groups. An inspection of his memoirs, however slight, is sufficient to indicate his keen and essential interest in the domain of geometry. But while his method was that of the group-theory, and while his investigations so frequently referred to geo-

© 1899 Nature Publishing Group

metry, his real aim is declared by Klein—and the declaration can find ample support from his memoirs and his treatises—to have been the achievement of progress in the theory of differential equations. It was for this purpose that he developed his theory of transformations, and worked at it from his earliest productive days to his latest with a consistent tenacity characteristic alike of the nature and the strength of his mathematical genius.

The death of Sophus Lie removes from the rank of active workers in pure mathematics one of the most conspicuous, independent, and original minds of his generation. A. R. F.

NOTES.

THE Joint Committee of the Royal Society and the Royal Geographical Society, appointed to promote the project of an Antarctic Expedition, have made recommendations to the Royal Society Council and to the Council of the British Association, in pursuance of which the Treasurer of the Royal Society has applied on behalf of the Council to the Government Grant Committee for 1000*l*., and the Council of the British Association has resolved to recommend to the General Committee to contribute a like amount towards the expenses of the proposed undertaking.

THE Croonian Lecture will be given at the Royal Society on Thursday next, March 16, by Dr. Burdon-Sanderson, F.R.S. Subject—"The Electrical Concomitants of Motion in Animals and Plants."

A MEETING of the committee of the Liverpool Association of Foreign Consuls was held on February 27, in the office of the Brazilian Consulate, for the purpose of taking into consideration the Liverpool School of Tropical Diseases and its recognition by the Governments represented. The company having been addressed by Mr. Alfred L. Jones, as representing the Congo Free State, and by Mr. Ehrenberg, consul for Sweden and Norway, it was agreed to hold a general meeting of the consuls on March 9, so that they might be better able to inform their Governments on the subject. Prof. Boyce then explained that four courses of two months each would be given to qualified men every year. Liverpool, he thought, was the best possible place in which to establish such a school, as they had examples of the diseases in question brought from all the tropical regions of the world. Besides instructing qualified medical men who would have appointments on shipboard, or intended to practise in tropical countries, they would admit missionaries to the classes, and would also train black women as nurses.

BEING invited to take part in the opening of the new School of Tropical Diseases at Liverpool, Prof. Koch has written regretting his inability to be present, and saying: "Permit me to express my sympathy with the new institution and to offer my best wishes for the success of your grand and useful undertaking. I certainly hope to be able later to have the opportunity to personally visit the new institution." In another letter the professor says: "Blackwater fever is the most important disease in West Africa, but one which, I am convinced, it will be easy to prevent when the course and character of the disease become more familiar. Up to the present we have received, with very few exceptions, very satisfactory accounts. Those practitioners in the tropics who have written, give nothing more than anecdotary reports of no scientific value whatever. It will be one of the most important duties of the new school to give medical men going out to the tropics a clear idea of the disease, and to impress on them how to make and collect scientific and useful observations. You in Liverpool have opportunities of seeing cases; even here in Germany I have seen five cases (two in Berlin) during the last half-year in persons who have returned from the tropics."

WE are informed by the Secretary of the Institution of Electrical Engineers that, as many members and others failed to gain admission to the meeting on March 2, Mr. Marconi has promised, at the request of the Council, to repeat his lecture on wireless telegraphy, with demonstration, on Thursday, March 16, in the theatre of the Examination Hall, Victoria Embankment. Up to 7.45 p.m. admission will be only by tickets, to be obtained by members on application to the Secretary.

THE Royal Institution Friday evening discourse on March 10 is on "Measuring Extreme Temperatures," by Prof. H. L. Callendar, F.R.S.; that on March 17 is on "The Electric Fish of the Nile," by Prof. Francis Gotch, F.R.S.; and that on March 24 on "Transparency and Opacity," by Lord Rayleigh, F.R.S.

THE new laboratories in connection with the Middlesex Hospital Medical School are, we hear, now completed. They are equipped with all the best modern appliances for the purpose of instruction and original research. An inaugural conversazione will be held on the evening of Wednesday, March 15, in the new buildings, when many objects of interest will be exhibited.

THE President of the Board of Trade has consented to receive a deputation of representatives from the Decimal Association, Chambers of Commerce, Educational Institutions, and Trades Unions on March 22, when the Government will be urged to make compulsory the use of the metric weights and measures after a period of two years, January 1, 1901, having been suggested as a suitable date for the introduction of the new system.

THE Fothergillian gold medal for 1899 has, on the recommendation of a special committee of the Medical Society of London, been awarded to Dr. S. Monckton Copeman "in recognition of his researches on the preservative effects of glycerine upon vaccine lymph and of the benefits in a practical sense that have arisen therefrom."

Science announces that the House Committee on Appropriations has recommended an increase of 4200 dollars in the annual appropriation for scientific work of the United States Fish Commission. This increase is made after an examination of the practical results that have attended the lines of scientific research carried on during the past year.

A BILL has been introduced into the New York Assembly appropriating 30,000 dollars to continue the promotion of the sugar beet industry. Of this amount 2500 dollars are devoted to making experiments by the Commissioner of Agriculture.

IT is reported that a committee has been appointed by the Council of the Institution of Electrical Engineers to inquire into the future of electrical engineering in the domain of telephony in this country.

ON November 17, 1897, the sum of twenty thousand dollars was given to the National Academy of Sciences, as trustee, to establish a fund to be known as the Benjamin Apthorp Gould Fund, in memory of the father of the donor, Miss Alice Bache Gould, the income to be used to assist the prosecution of researches in astronomy. A sufficient available income has now accrued from the fund to warrant beginning its distribution, and the Directors are prepared to receive and consider applications for appropriations. In accordance with the wish of the donor, work in the astronomy of precision shall, in all cases, be given the preference over any work in astrophysics. The fund is in-

© 1899 Nature Publishing Group